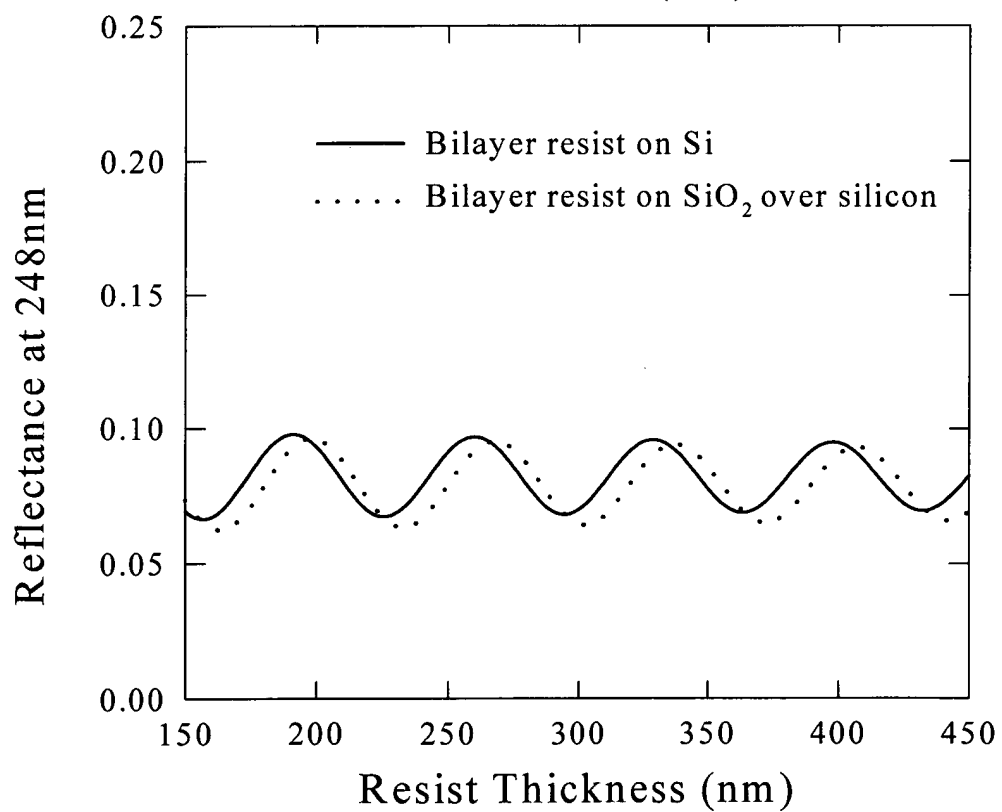


(a)

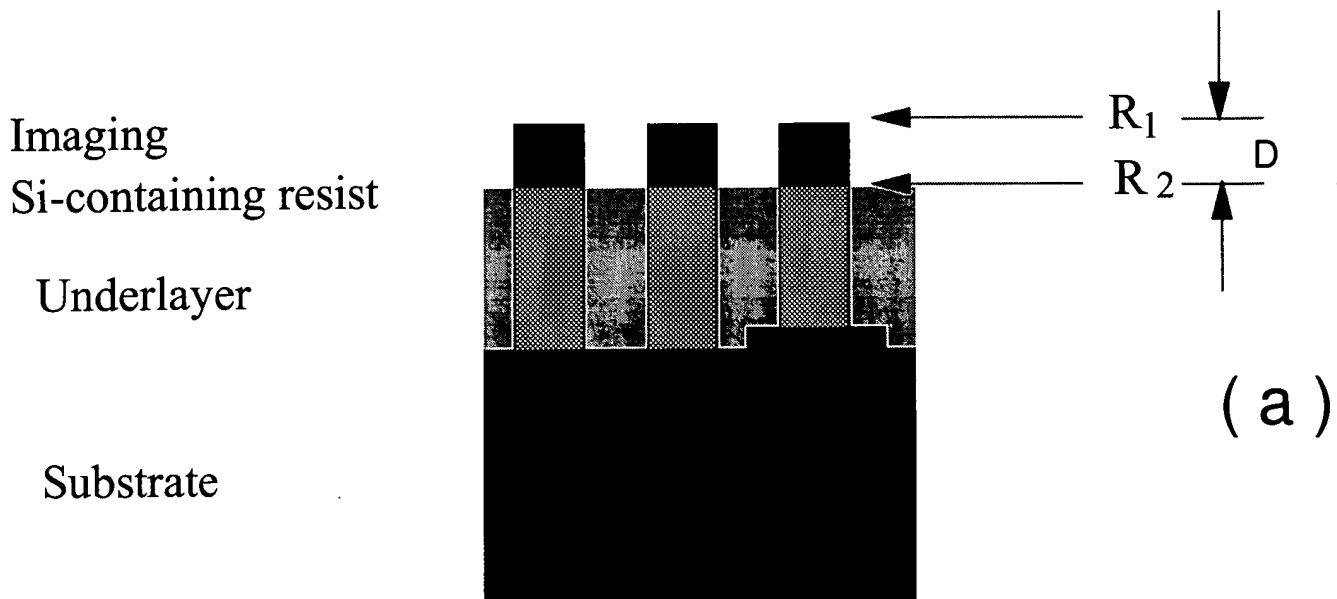


(b)

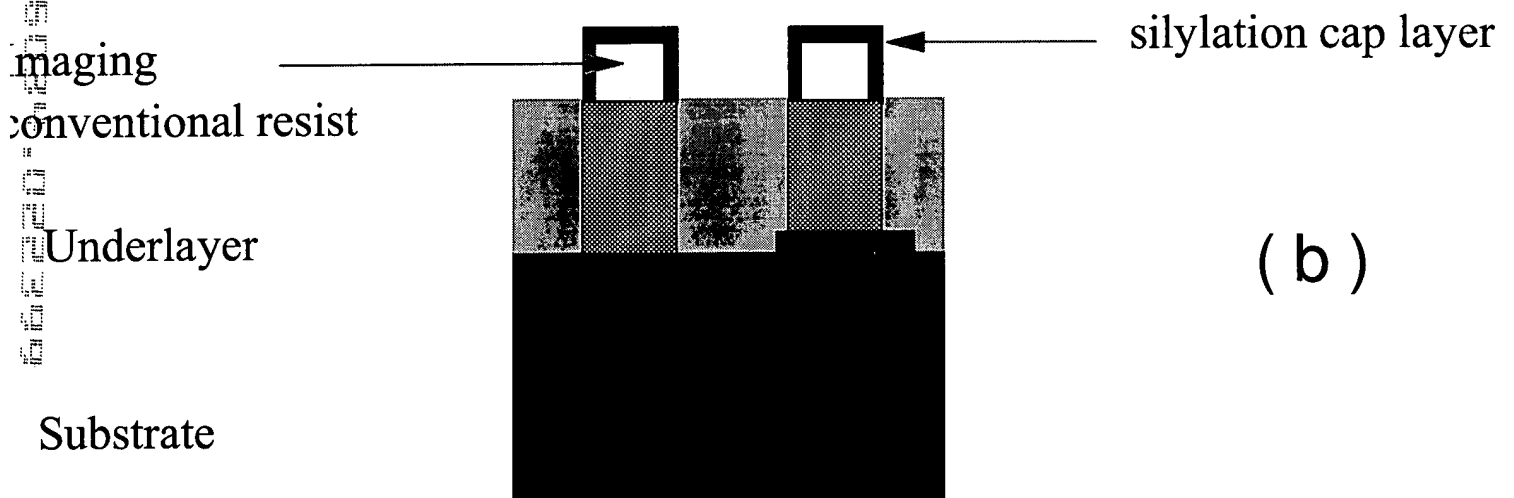
(a) Swing curve of SLR on BARC, (b) Swing curve of bilayer resist

Fig. 1

● Bi-layer resist scheme ●



Top surface imaging (silylation reaction) scheme



$$S \cong 4 \sqrt{R_1 R_2} \cdot e^{-\alpha D} \quad (c)$$

R_1 - Reflectivity at top resist/air interface at 248nm

R_2 - Reflectivity at underlayer/top resist interface at 248nm

Fig. 2

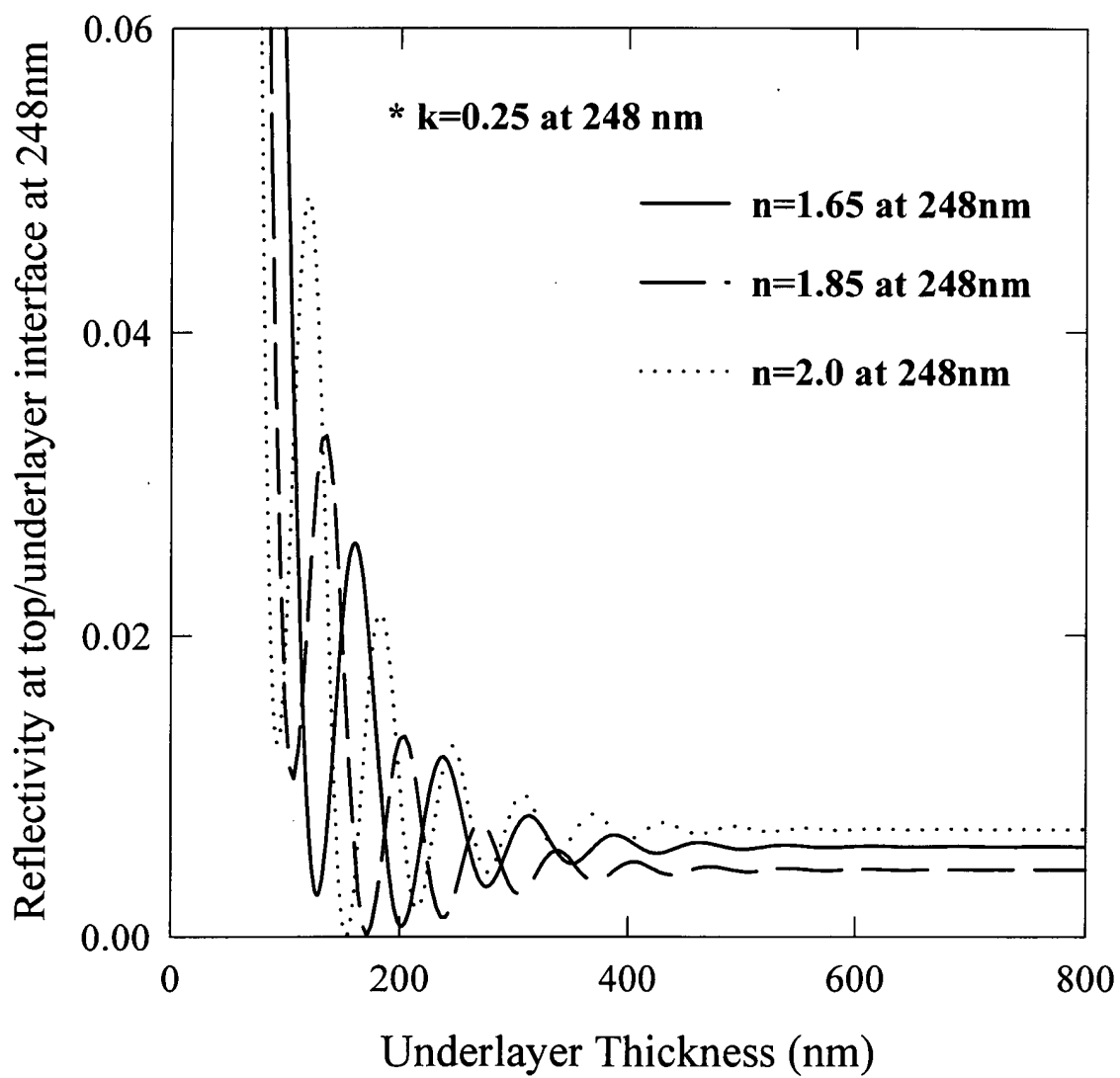


Fig. 3

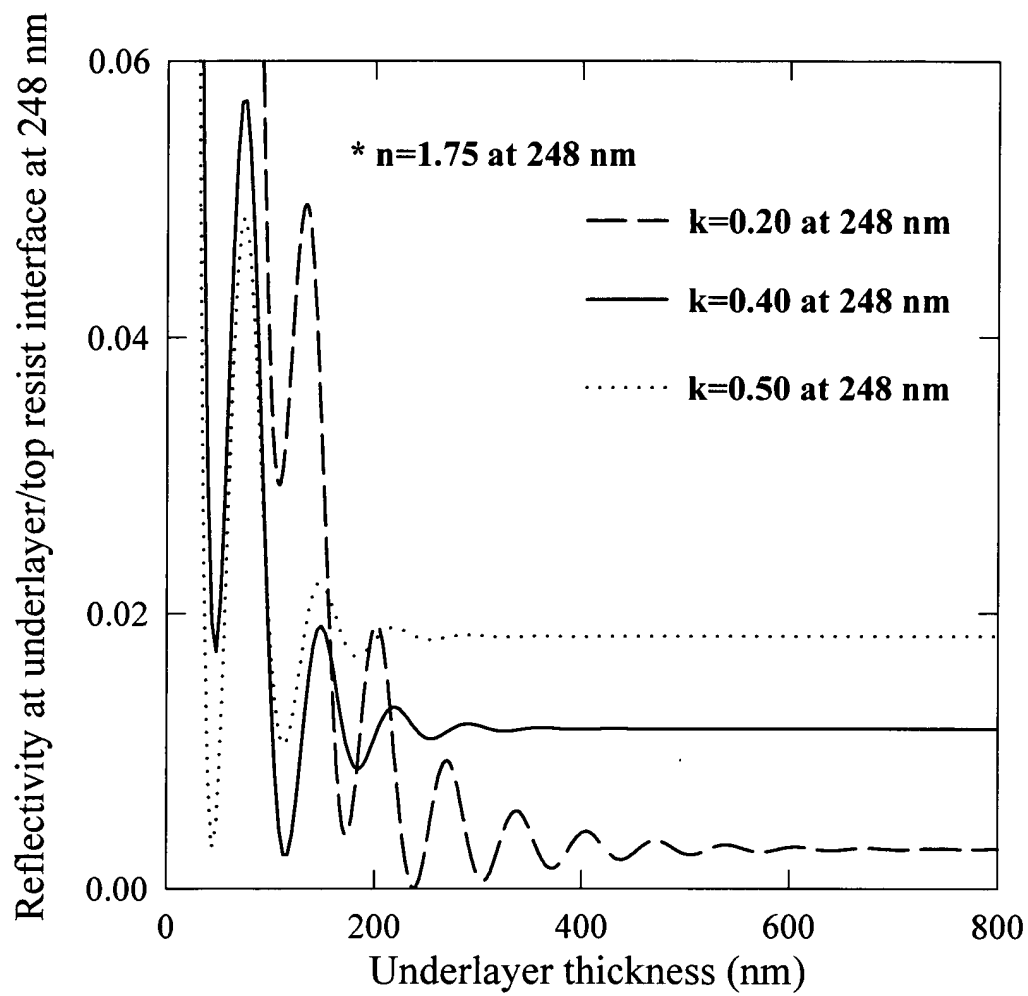


Fig. 4

Time & Date: 13:48:07 , 02-11-1999

Lot Id : G1

Sample Id : 2500rpm, 120/30+250/180

Position Id:

Operator : Katya

Comments :

Data : R = C:\DATA\KATYA\1998\UNDER_L\g1_250180.dat

T = None

Goodness of Fit = 0.0029

Eg(V) = 2.78eV

Hydrogen content = 48.3 %

Film StructureInterface RoughnessThickness

WL (nm)	193	248	365	633
n	1.603	1.869	1.740	1.663
k	0.527	0.223	0.074	0.005
Rexp	0.09	0.10	0.07	0.32
Rcalc	0.09	0.10	0.07	0.32

OA (F) →

unknown

7630 Å

OA (F) →

Si
Substrate

1.00 mm (F)

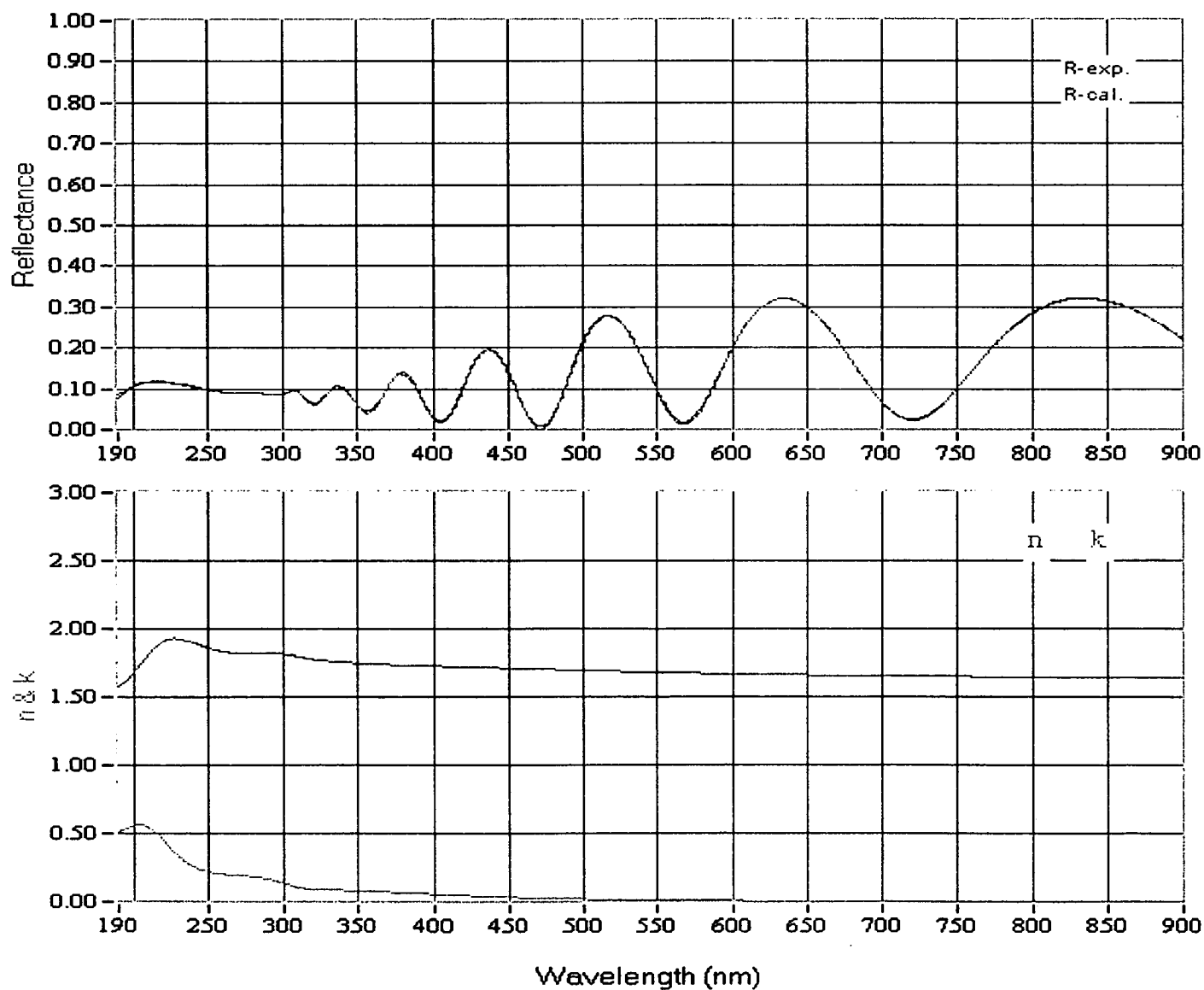


Fig. 5

Time & Date: 13:55:27 , 02-11-1999

Lot Id : Bar1

Sample Id : MTI 230/4 min

Position Id:

Operator : Katya

Comments :

Data : R = C:\DATA\KATYA_OL\BOTTOM\Bar1_mti.dat

T = None

Goodness of Fit = 0.0052

Eg(V) = 4.14eV

Hydrogen content = 49.8 %

Film StructureInterface RoughnessThickness

WL(nm)	193	248	365	633
n	2.314	1.829	1.692	1.603
k	0.199	0.165	0.001	0.001
Rexp	0.14	0.09	0.40	0.13
Rcalc	0.16	0.09	0.42	0.13

0A (F) ->

unknown

7214 A

0A (F) ->

Si
Substrate

1.00 mm (F)

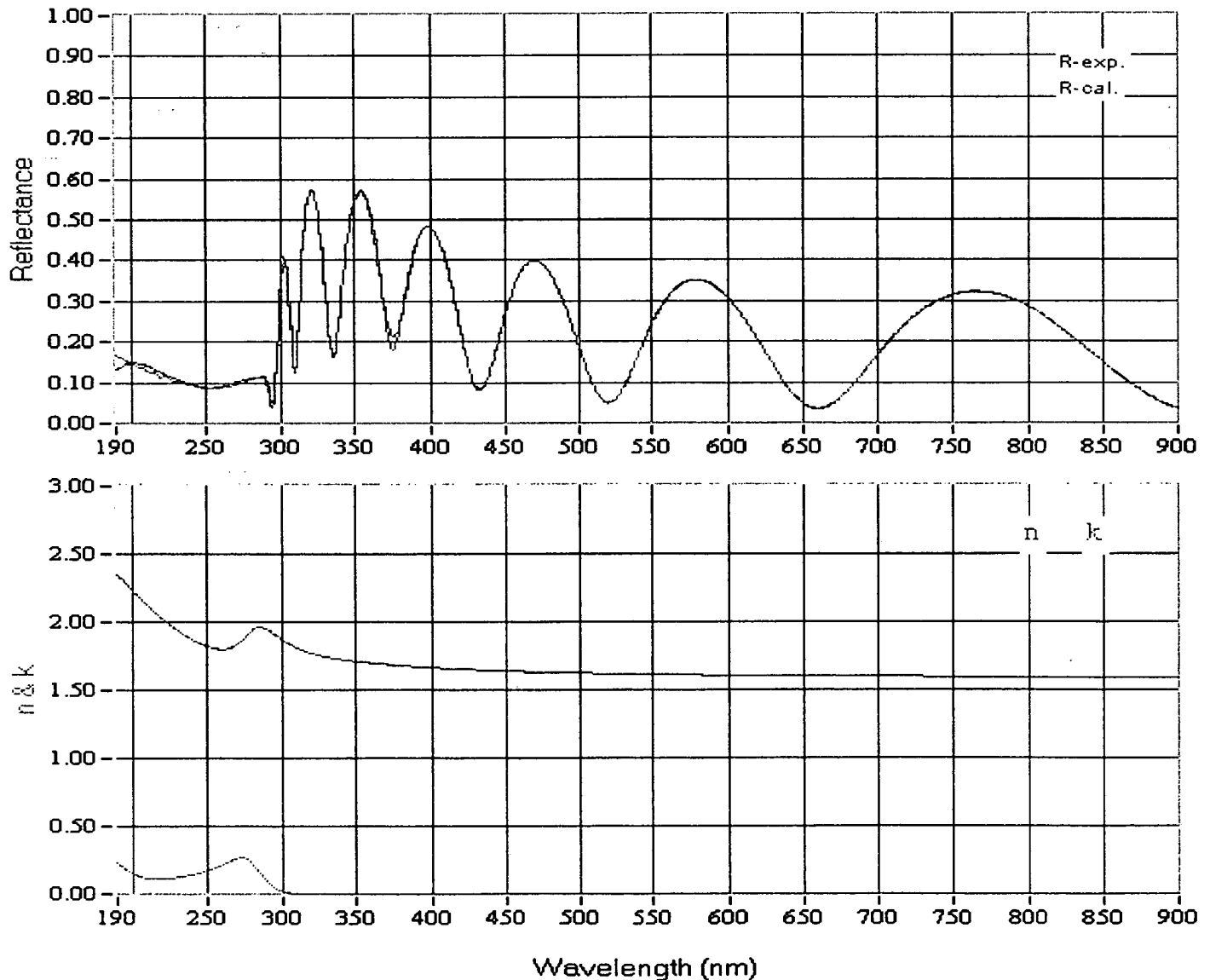


Fig. 6

Time & Date: 13:34:03 , 02-11-1999
 Lot Id : E2ZA
 Sample Id : kb121198_1 (15)
 Position Id: 3000rpm, 120/30+155/120
 Operator : Katya
 Comments : center
 Data : R = C:\DATA\KATYA\1998\UNDER_L\e2za.dat
 T = None

Goodness of Fit = 0.0064 $E_g(V) = 4.10\text{eV}$
 Hydrogen content = 49.9 %

Film Structure

Interface Roughness

Thickness

WL (nm)	193	248	365	633
n	1.904	1.750	1.712	1.647
k	0.777	0.193	0.042	0.000
Rexp	0.15	0.07	0.20	0.32
Rcalc	0.16	0.08	0.20	0.33

OA (F) → unknown ?
 OA (F) → Si Substrate 1.00 mm (F)

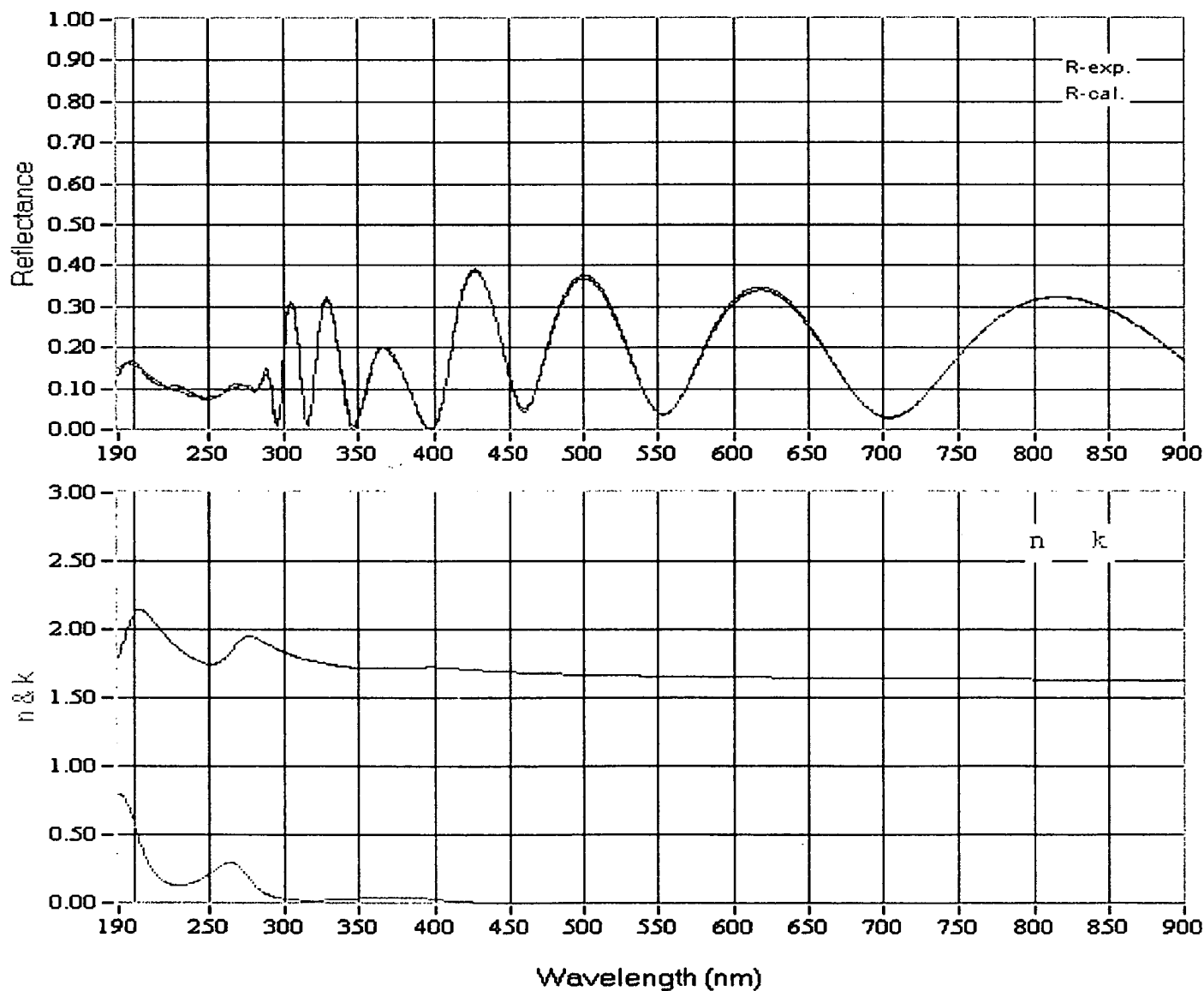
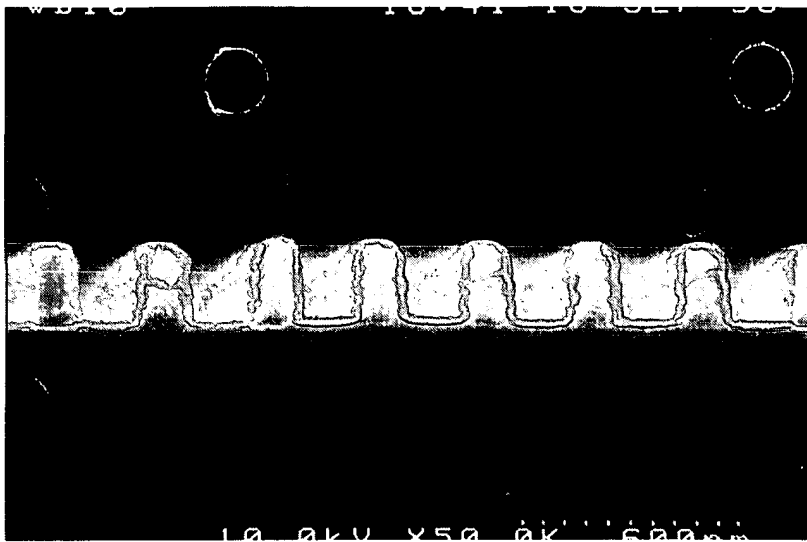
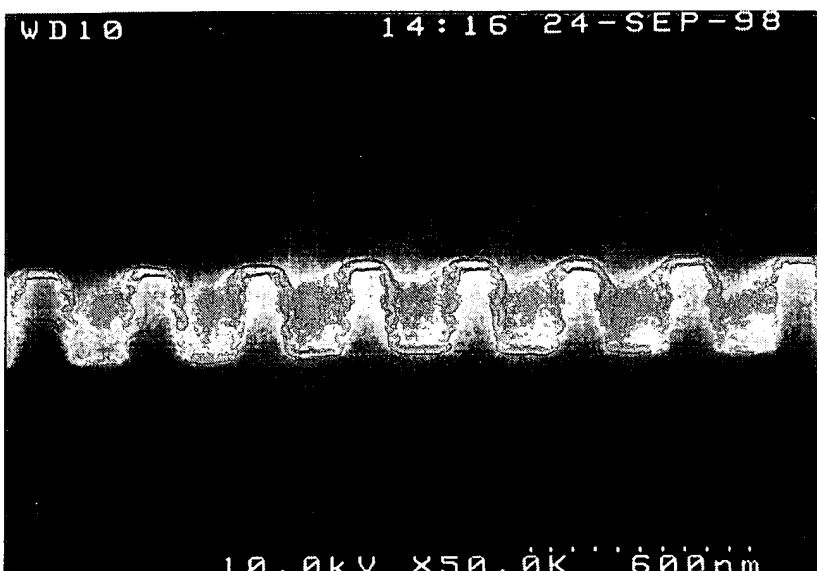


Fig. 7



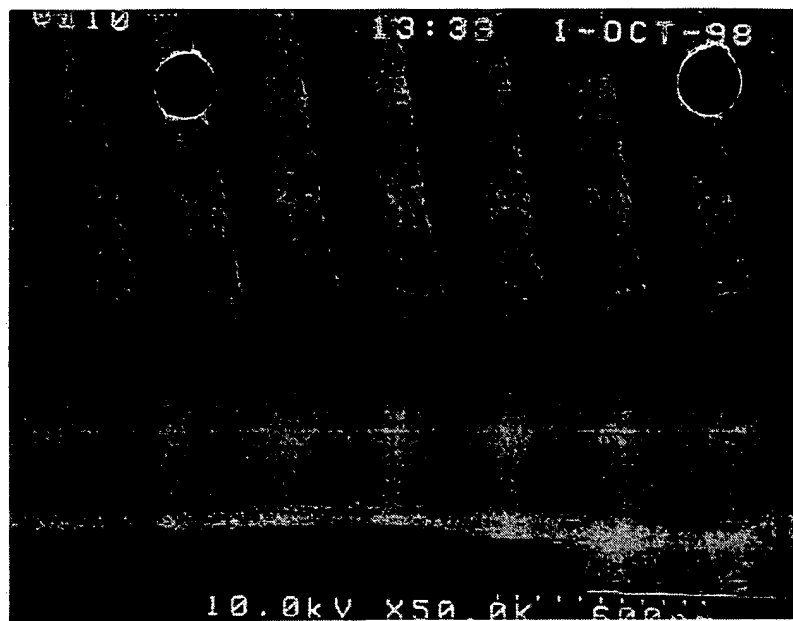
novolak underlayer with $k=0.20$ at 248nm



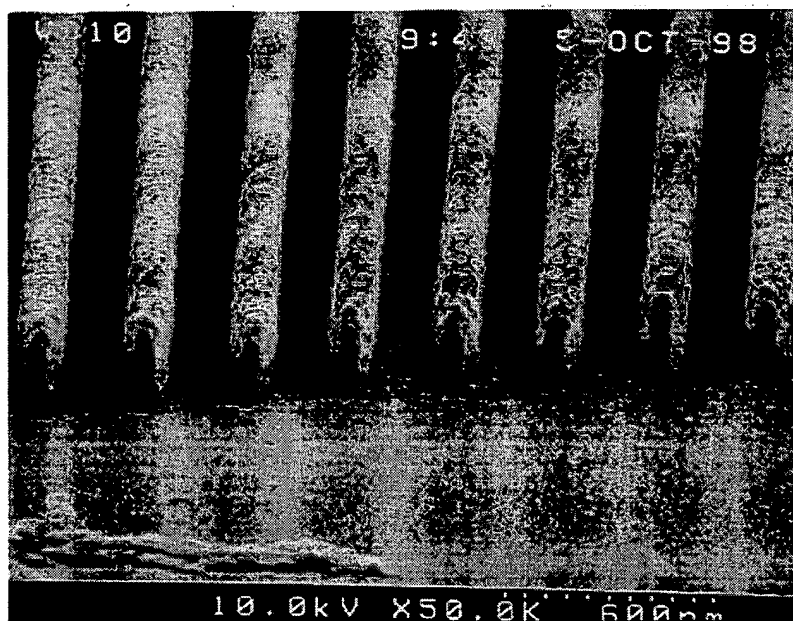
novolak underlayer with $k=0.35$ at 248nm



novolak underlayer with $k=0.08$ at 248nm



(a)



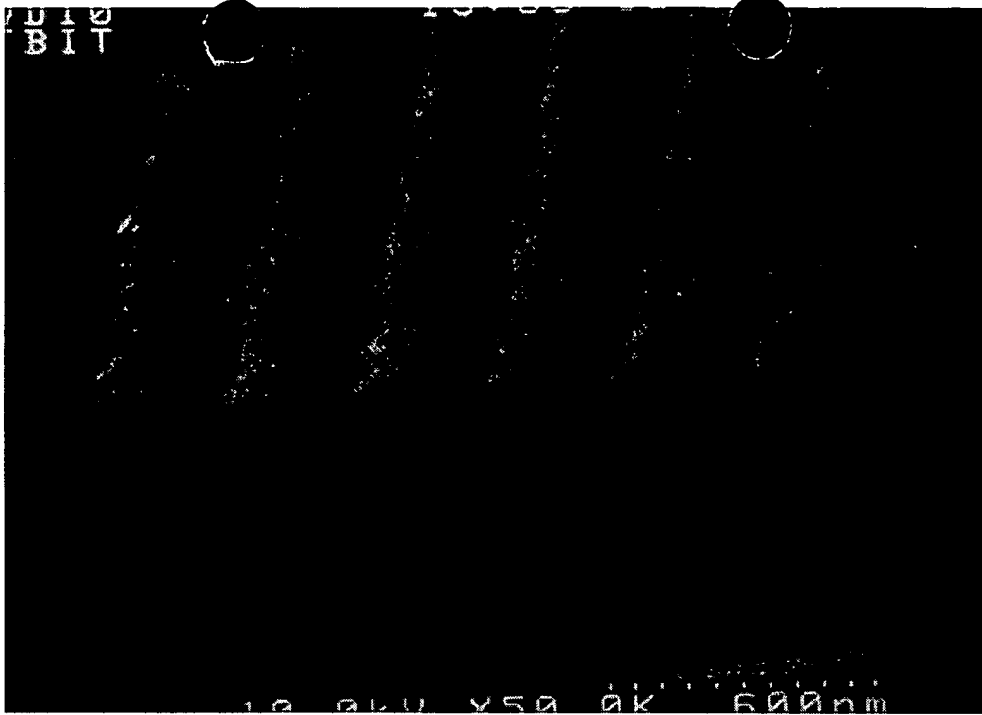
(b)



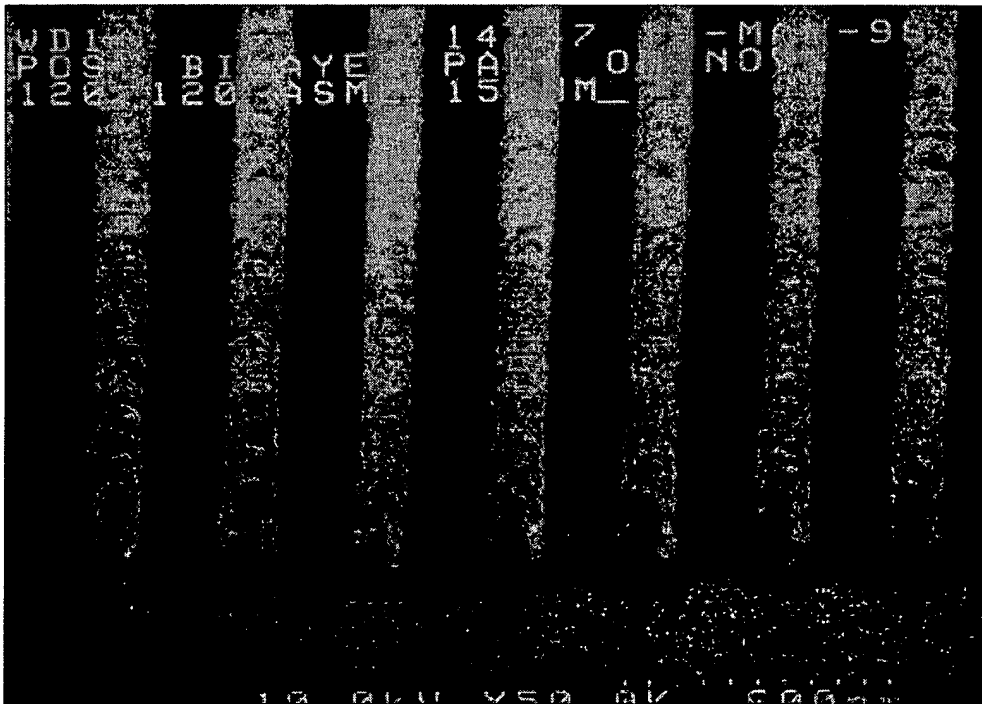
(c)

Fig. 9

202504090900



(a)



(b)

Fig. 10

66220-46099260

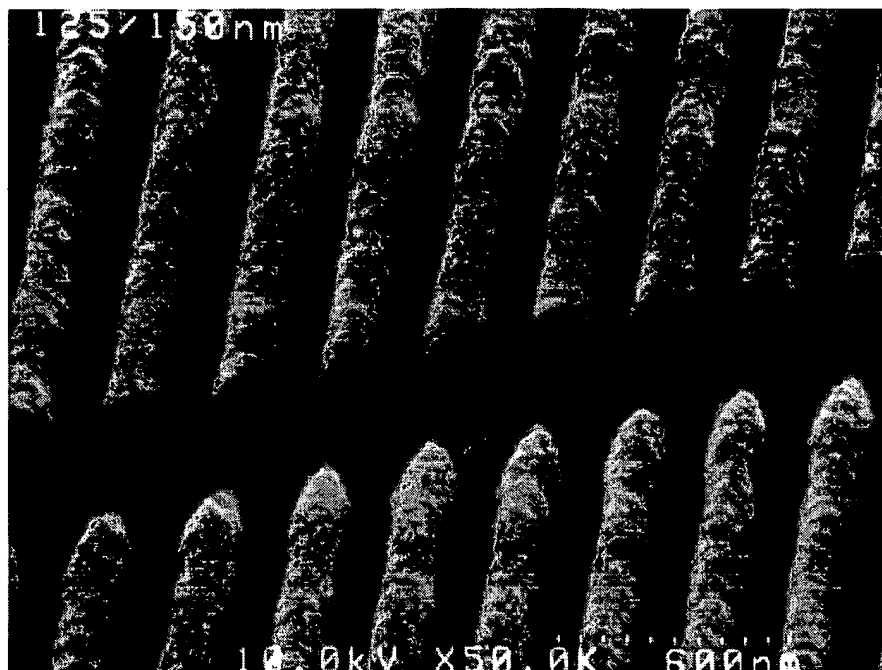
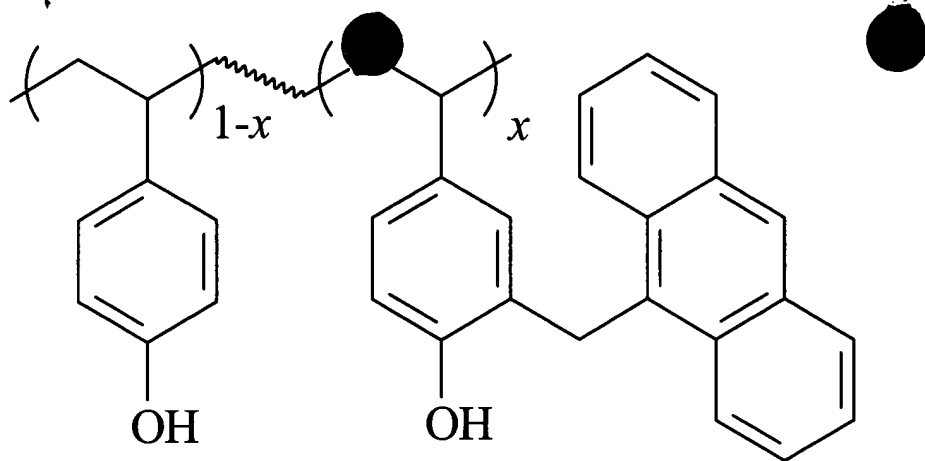
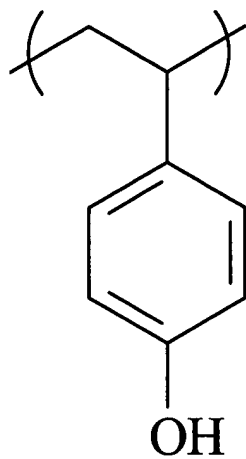


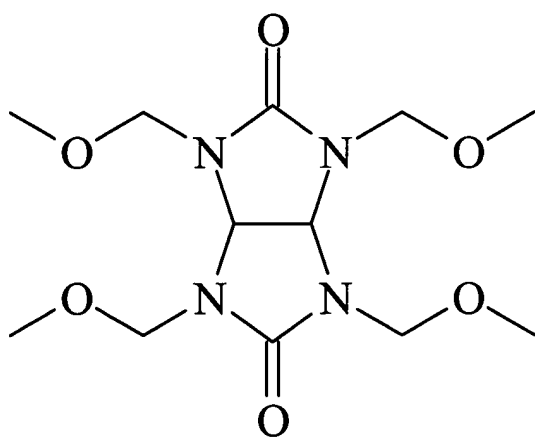
Fig. 11



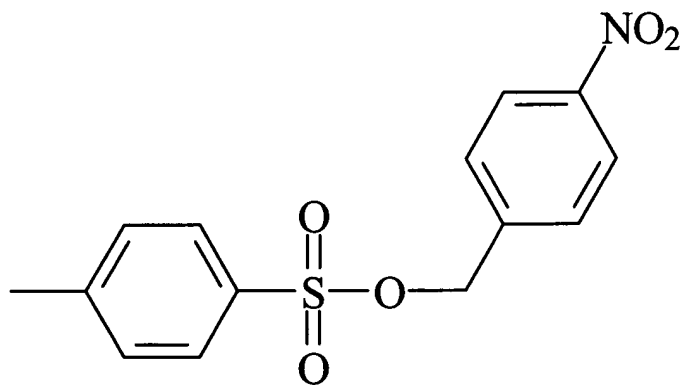
(a)



(b)



(c)



(d)

Fig. 12

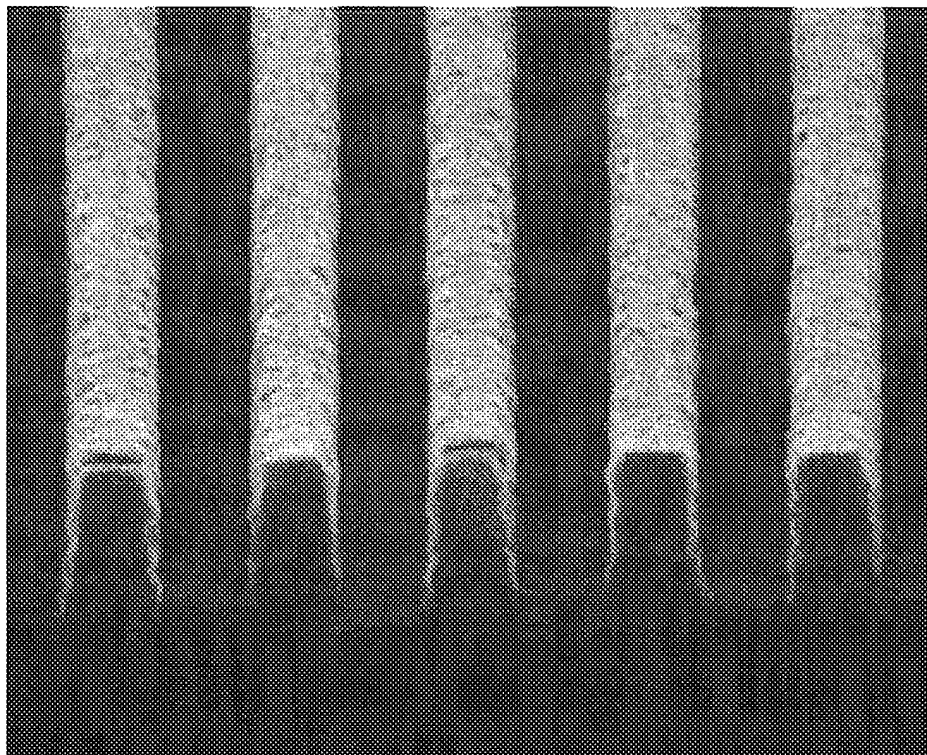


Fig. 13

662626-4695260

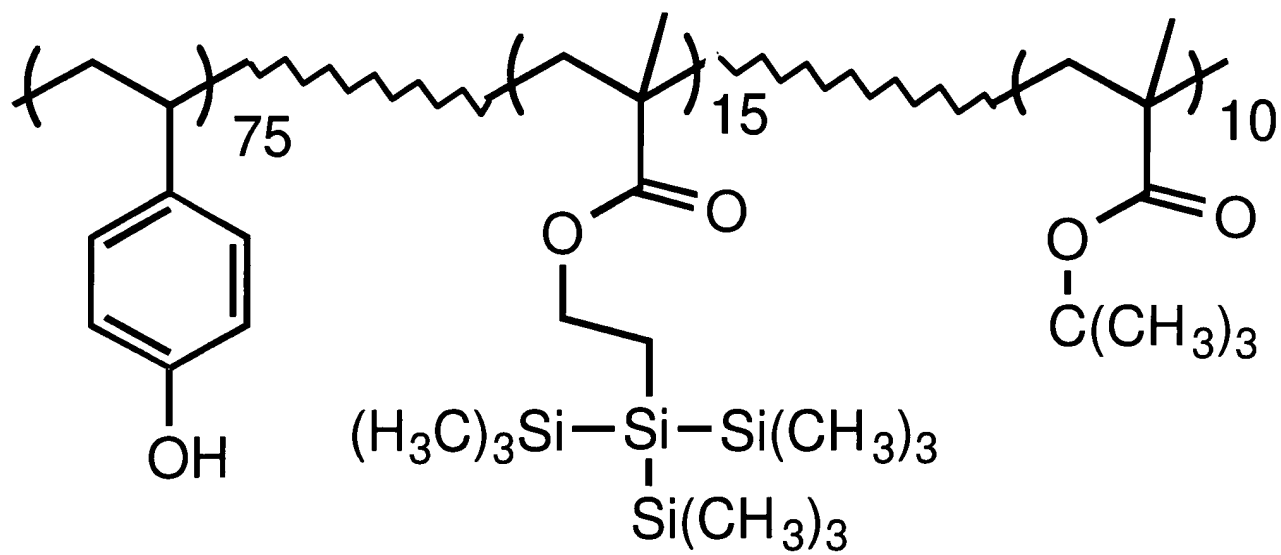


Fig. 14